

**TYPE APPROVAL CERTIFICATE****This is to certify:****That the Pipe Couplings**with type designation(s)  
**90° flared flange connections**

Issued to

**I.M.M. Hydraulics S.p.A.**  
**Atessa CH, Italy**

is found to comply with

**DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**  
**DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018**  
**DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints****Application :****Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.****Temperature range:** - 10 to + 300°C (see page 4)  
**Max. working press.:** up to 20 bar (see page 2 & 3)  
**Sizes:** 1/2" to 10" (see page 2 & 3)Issued at **Høvik** on **2019-03-11**for **DNV GL**This Certificate is valid until **2023-06-30**.DNV GL local station: **Helsinki**Approval Engineer: **Maheshraja Venkatesan**

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**Marianne Spæren Marveng**  
**Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Job Id: **262.1-021477-4**  
 Certificate No: **TAP00000KK**  
 Revision No: **1**

## Product description

Pipe couplings with 90° flared tubes connections.

Material of construction for flanges:

- Carbon steel: S235, ASTM A105, S355
- Stainless steel: AISI 316, 1.4462 (UNS S32205) from EN 10028-7
- ASTM B466 UNS C70600 (Temper condition H55 or H80)
- EN 12449 CuNi10Fe1Mn (material condition R310/ R380)
- ASTM B265 Gr.2 (UNS R50400)

Material of construction for flared tube:

- P235GH, ASTM A106 Gr. B and E235
- Stainless steel: AISI 316, 1.4462 (UNS S32205) from EN 10028-7
- ASTM B466 UNS C70600 (Temper condition H55 or H80)
- EN 12449 CuNi10Fe1Mn (material condition R310/ R380)
- ASTM B265 Gr.2 (UNS R50400)

Sealing materials: Klinger, AF-400 and PTFE

## Application/Limitation

Maximum working pressure [MWP]:

Type	Size	Pipe OD (mm)		MWP [bar]	
		'Schedule series'	'Metric size'		
SAE J518C	308N	½"	21.3	25	16
	312N	¾"	21.3	30	16
	316N	1"	33.4	38	16
	320N	1 ¼"	42.4	42	16
	124N	1 ½"	48.3	50	16
	132N	2"	60.3	60	16
	140N	2 ½"	73	73	16
	148N	3"	88.9	90	16
	164N	4"	114.3	115	16
	180N	5"	139.7	140	16
	196N	6"	168.3	165	20
228N	8"	219.1	220	20	
ASME B16.5	1 ½"	48.3	50	20	
	2"	60.3	60	20	
	2 ½"	73	73	20	
	3"	88.9	90	20	
	4"	114.3	115	20	
	5"	139.7	140	20	
	6"	168.3	165	20	
EN 1092-1	1 ½"	48.3	50	PN10/16	
	2"	60.3	60	PN10/16	
	2 ½"	73	73	PN10/16	
	3"	88.9	90	PN10/16	
	4"	114.3	115	PN10/16	
	5"	139.7	140	PN10/16	
	6"	168.3	165	PN10/16	
	8"	219.1	220	PN10/16	
10"	273	273	PN10/16		
GSJIS-10-16K-DN32	DN32	42.4	42	16	
GSJIS-10-16K-DN40	DN40	48.3	50	16	
GSJIS-10K-DN50	DN50	60.3	60	10	

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GSJIS-10K-DN65	DN65	73	73	10
GSJIS-10K-DN80	DN80	88.9	90	10
GSJIS-10K-DN100	DN100	114.3	115	10
GSJIS-10K-DN125	DN125	139.7	140	10
GSJIS-10K-DN150	DN150	168.3	165	10
GSJIS-10K-DN200	DN200	219.1	220	10
GSJIS-16K-DN50	DN50	60.3	60	16
GSJIS-16K-DN65	DN65	73	73	16
GSJIS-16K-DN80	DN80	88.9	90	16
GSJIS-16K-DN100	DN100	114.3	115	16
GSJIS-16K-DN125	DN125	139.7	140	16
GSJIS-16K-DN150	DN150	168.3	165	16
GSJIS-16K-DN200	DN200	219.1	220	16

Couplings covered by this certificate are approved to be used according to the latest requirements of governing rules in following applications:

<p><b>1) Flammable fluids (flash point ≤ 60°C)</b></p> <ul style="list-style-type: none"> <li>- Cargo oil lines <sup>(4)</sup></li> <li>- Crude oil washing lines <sup>(4)</sup></li> <li>- Vent lines <sup>(3)</sup></li> </ul> <p><b>2) Inert gas</b></p> <ul style="list-style-type: none"> <li>- Water seal effluent lines</li> <li>- Scrubber effluent lines</li> <li>- Main lines <sup>(2)(4)</sup></li> <li>- Distributions lines <sup>(4)</sup></li> </ul> <p><b>3) Flammable fluids (flash point &gt; 60°C)</b></p> <ul style="list-style-type: none"> <li>- Cargo oil lines <sup>(4)</sup></li> <li>- Fuel oil lines <sup>(2)(3)</sup></li> <li>- Lubricating oil lines <sup>(2)(3)</sup></li> <li>- Hydraulic oil <sup>(2)(3)</sup></li> <li>- Thermal oil <sup>(2)(3)</sup></li> </ul> <p><b>4) Sea water <sup>(7)</sup></b></p> <ul style="list-style-type: none"> <li>- Bilge lines <sup>(1)</sup></li> <li>- Water filled fire extinguishing systems, e.g. sprinkler systems <sup>(3)</sup></li> <li>- Non-water filled fire extinguishing systems, e.g. foam, drencher systems <sup>(3)</sup></li> <li>- Fire main (not permanently filled) <sup>(3)</sup></li> <li>- Ballast system <sup>(1)</sup></li> <li>- Cooling water system <sup>(1)</sup></li> <li>- Tank cleaning services</li> <li>- Non-essential systems</li> </ul>	<p><b>5) Fresh water</b></p> <ul style="list-style-type: none"> <li>- Cooling water system <sup>(1)</sup></li> <li>- Condensate return <sup>(1)</sup></li> <li>- Non-essential system</li> </ul> <p><b>6) Sanitary/drains/scuppers</b></p> <ul style="list-style-type: none"> <li>- Deck drains (internal) <sup>(6)</sup></li> <li>- Sanitary drains</li> <li>- Scuppers and discharge (overboard)</li> </ul> <p><b>7) Sounding/vent</b></p> <ul style="list-style-type: none"> <li>- Water tanks/dry spaces</li> <li>- Oil tanks (f.p. &gt; 60°C) <sup>(2)(3)</sup></li> </ul> <p><b>8) Miscellaneous</b></p> <ul style="list-style-type: none"> <li>- Starting/control air <sup>(1)</sup></li> <li>- Service air (non-essential)</li> <li>- Brine</li> <li>- CO<sub>2</sub> system <sup>(1)</sup></li> <li>- Steam <sup>(5)</sup></li> </ul>
<p>(1) Inside machinery spaces of category A - only approved fire resistant types*</p> <p>(2) Not inside machinery spaces of category A or accommodation spaces. May be accepted in other machinery spaces provided the joints are located in easily visible and accessible positions.</p> <p>(3) Approved fire resistant types* except in cases where such mechanical joints are installed on exposed open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines.</p> <p>(4) Only in pump rooms and open decks - only approved fire resistant types*</p> <p>(5) May be used for pipes on deck with a design pressure of 10 bar or less.</p> <p>(6) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.</p> <p>(7) Couplings made of specific material grade 1.4462 (UNS S32205) only are allowed in sea water systems, and only at room temperature conditions.</p>	

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- \* *Approved fire resistant type:* Coupling of size 8" with Klinger sealing & design pressure up to 16 bar made of carbon & stainless steel material grades

The temperature range is dependant on the sealing material as follows:-

Klingersil : -10 to + 300 °C  
AF-400 : -10 to + 250 °C  
PTFE : -10 to + 260 °C

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions.

The approval is only valid when the couplings are assembled with tubing of correct temper and tolerances as recommended by the manufacturer. These couplings should not be used on tubes in cold fabricated (hard temper) conditions.

For low temperature applications, impact testing requirements as given in relevant chapters of DNV GL Pt. 2 Ch. 2 shall be followed for the corresponding piping components (E.g., flanges & bolting)

The installation of mechanical joints is to be in accordance with the manufacturer's assembly instructions.

### **Type Approval documentation**

Catalogue 8990306602 'GS-FLANGE SYSTEM' Revision February 2016

Technical specification: Gasket sheet Gambit AF-400

Technical specification KLINGERSil C-4430

Technical Data Sheet GSJIS-90° Flanges – JIS B2220

Authorization letter QA016/18 for change of ownership from GS Hydro to IMM Hydraulics

'Statement of specimen tightness tests' from Eurofins Expert Services Oy dated 2019-01-11

'Statement' from DNV GL Surveyor related to witnessed tests dated 2019-01-17

Reports:

- Vibration & impulse test report VTT-S-03301-18
- Vibration & impulse test report PRCS003228-C
- Burst test for type 312N30x3 under drawing 2017-011-83 witnessed by DNVGL Surveyor dated 2018-09-03
- 'Sprengtest-GS90°Flare-ASME B16.5#15WP 20 bar" witnessed by DNV GL surveyor dated 2012-02-13
- Tightness test report dated 2001-03-12
- Burst test dated 29.10.2008 witnessed by GL Surveyor
- Fire test report no. VTT-S-3335-09 dated 15<sup>th</sup> June 2009
- Pressure test after fire test dated 7.5.2009 for type DN200/220x6

### **Tests carried out**

Tightness, burst, fire (for size 8"), vibration and pressure pulsation

### **Marking of product**

For traceability to this type approval the products are to be marked:

- Manufacturers name or trade mark
- Type designation
- Size

### **Periodical assessment**

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNVGL-CP-0338.